

SARA

UNIVERSITE CHOLAIB DOUKKALI

AZOTE

N° Z=7

 $1s^2 2s^2 2p^3$ 5e de valence

Préparation

 V_H

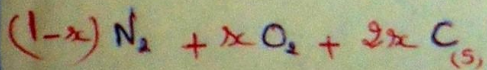
Industrie

Par distillation fractionnée
de l'air.

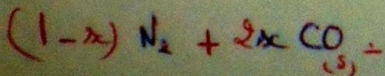
↓

Il reste des traces
d'oxygène.Par éliminer les traces O_2

↓

on fait réagir l'azote
impur sur le charbon.

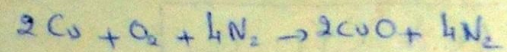
↓



Au Laboratoire

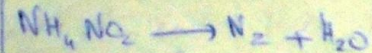
Élimination de l'oxygène

↓ en le fixant sur un métal



Décomposition thermique

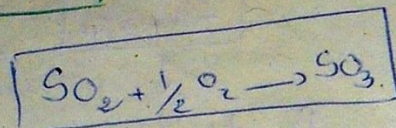
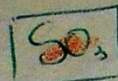
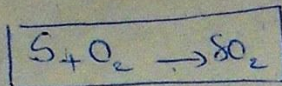
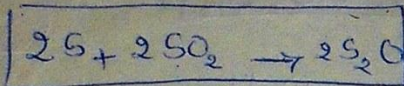
du Nitrate d'ammonium



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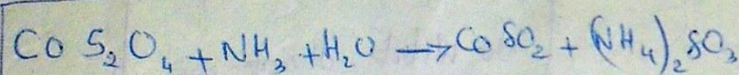
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Oxydes de Soufre

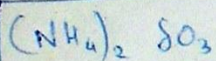


OxoAcides du Soufre

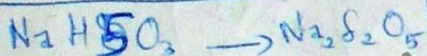
Acide sulfureux



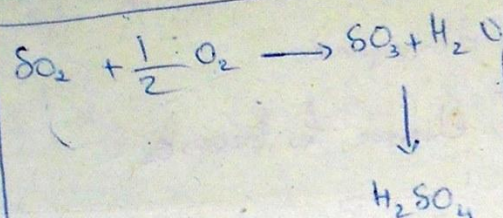
Acide sulfureux H_2SO_2



Acide disulfureux $\text{H}_2\text{S}_2\text{O}_5$



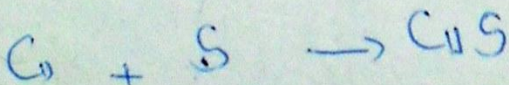
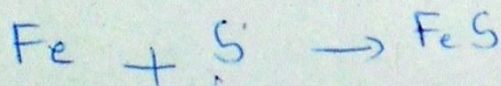
Acide sulfurique



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Sulfures

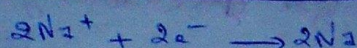


Sodium

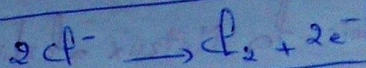
Le sel NaCl

Le sel est produit par électrolyse de NaCl .

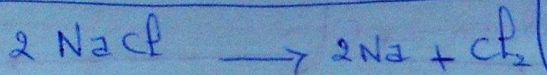
Cathode (reduction)



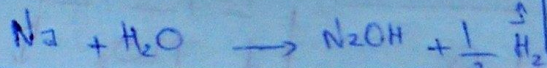
Anode (oxydation)



R.G



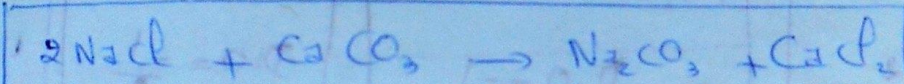
Réaction endothermique.



Réaction exothermique.

Carbonate de sodium

Na_2CO_3 (Neutralisant des Acides)



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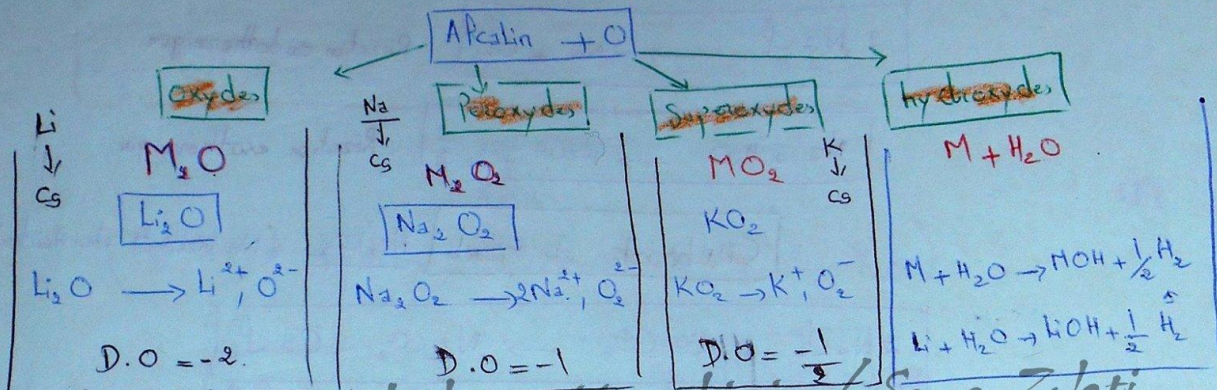
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Les Alcalins

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Groupe I_A : Li, Na, K, Rb, Cs, Fr

- Pour obtenir les Métaux alcalins on fait l'électrolyse des chlorures fondus. (électrolyte)
- Les Alcalins sont des éléments très Réducteurs.

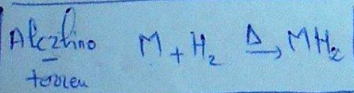
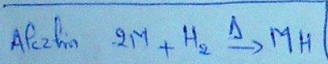


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Les Composés des Alcalins

Les hydrides

chiffage du métal
dans l'hydrogène.



(F, Cl, Br, I)

Les halogénures

plus la liaison est ionique
plus le point de fusion ↑

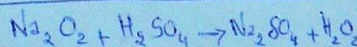


Li
↓
Cs

Peroxydes



Na
↓
Cs



Superoxydes

K → Cs.

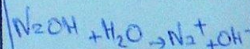
Les hydroxydes



Li
↓
Cs

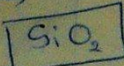
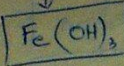
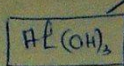
Absorbe l'humidité
de l'air.

Sont des
Bases
Fortes.

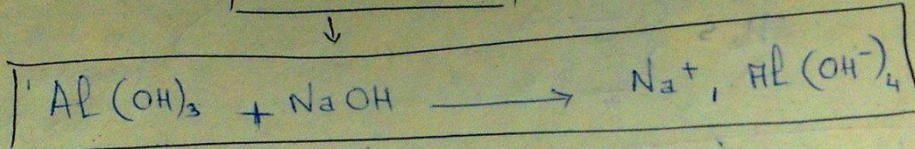


L'aluminium est préparé à partir de la Bauxite. (Un Minéral Naturel)

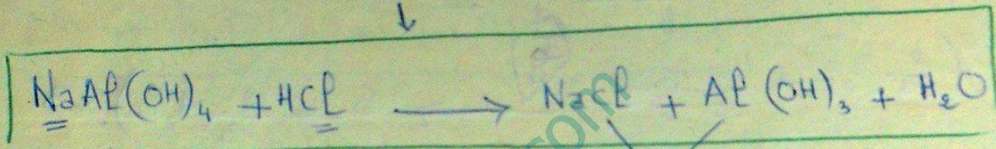
Bauxite



En Milieu Basique ($NaOH$)



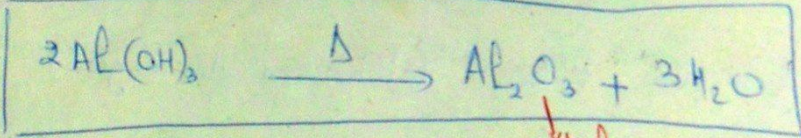
Précipitation de $Al(OH)_3$



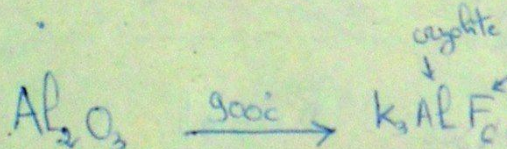
on sépare $Al(OH)_3$ et $NaCl$ par filtration et lavage

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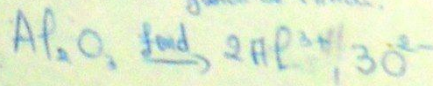
Calcination de $Al(OH)_3$



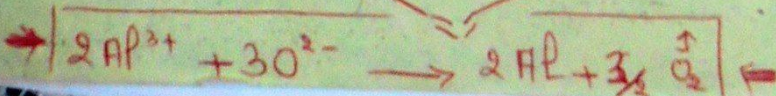
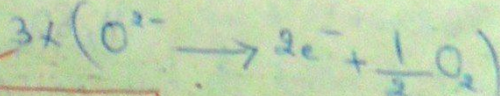
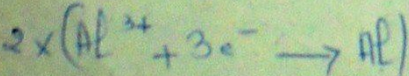
L'alumine.



Le sel est de bauxite. La température de fusion de melle.

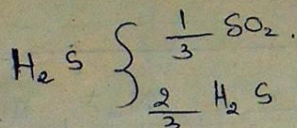


Electrolyse

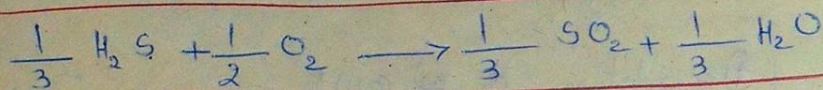
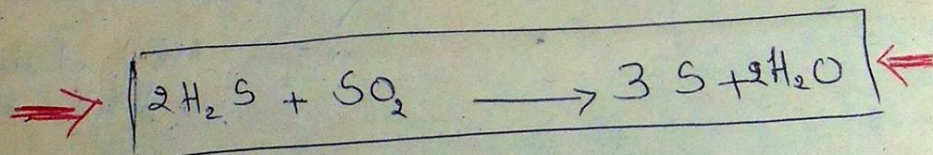
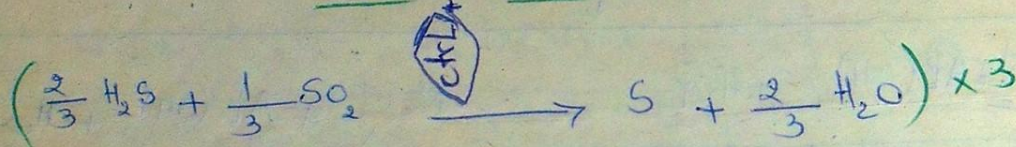


Le SoufrePréparation

par oxydation d'une partie de H_2S en SO_2

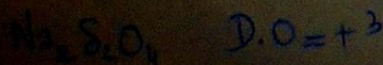
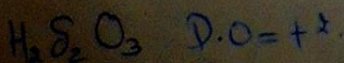
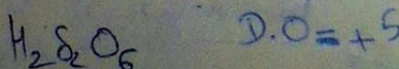
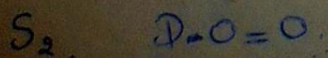
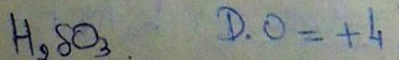


Ces deux composés réagissent entre eux pour donner le Soufre.

Réaction de ClausUtilisation

Pour fabriquer H_2SO_4 (élaboration des engrais)

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D.O.

Royaume du Maroc
UNIVERSITE CHOUAIB DOUKKALI
FACULTE DES SCIENCES

EL JADIDA

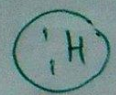
$\Delta(H) = 2,1$

HYDROGENE

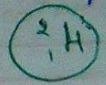
①

1s¹ = groupe IA (1^{er} & 2^e - 1^{ère} colonne)

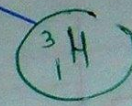
Trois Isotopes



Hydrogène



^2_1D : Détérium



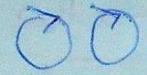
^3_1T : tritium

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Les Formes d'hydrogènes

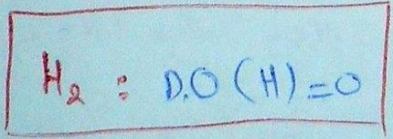
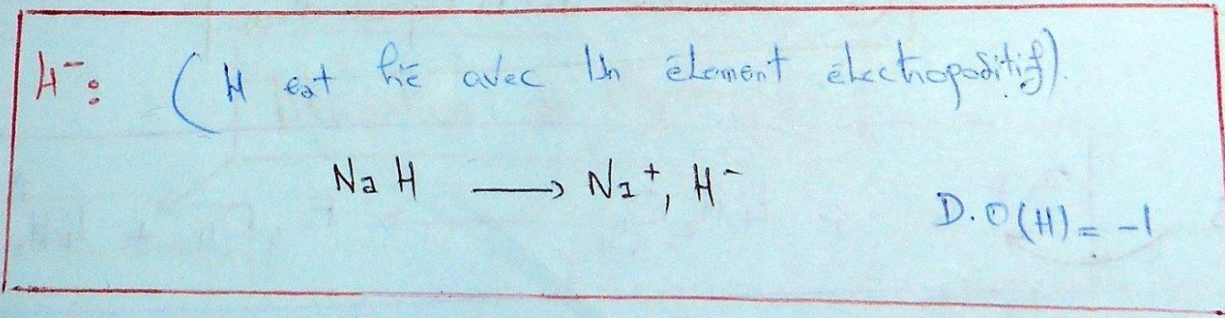
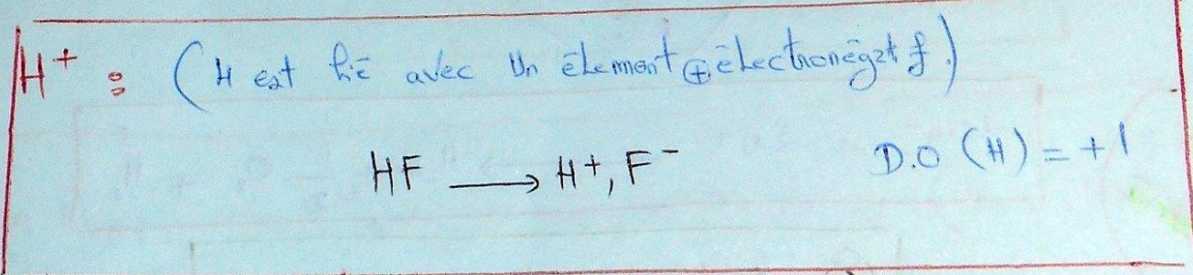
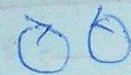
Ortho hydrogène

Spins Nucleaires paralleles



Para hydrogène

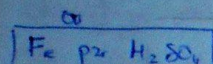
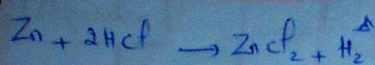
Spins Nucleaires antiparalleles



Préparation de l'hydrogène

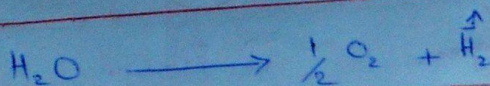
À Laboratoire

↓
Par attaque d'un métal
par un Acide.



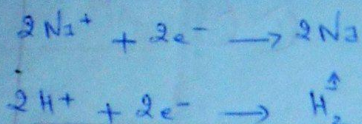
Industrie (à partir de l'eau)

① Dissociation

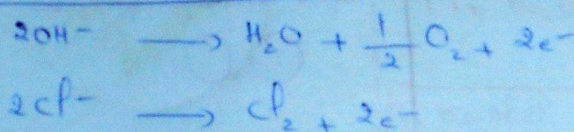


② Electrolyse de l'eau (20% de NaCl)

cathode (Réduction)

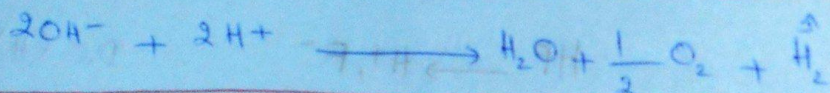


Anode (oxydation)



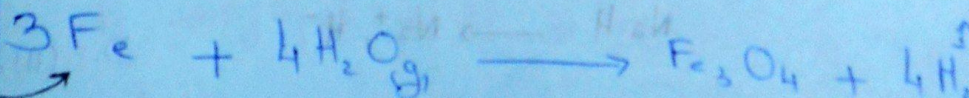
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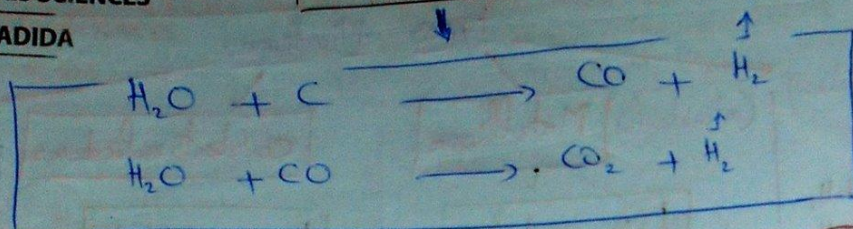
③ Réduction de la Vapeur d'eau.

Alcalins

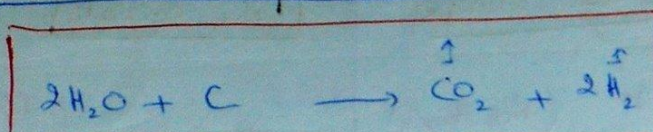


A partir du carbone et de Vapeur d'eau

②



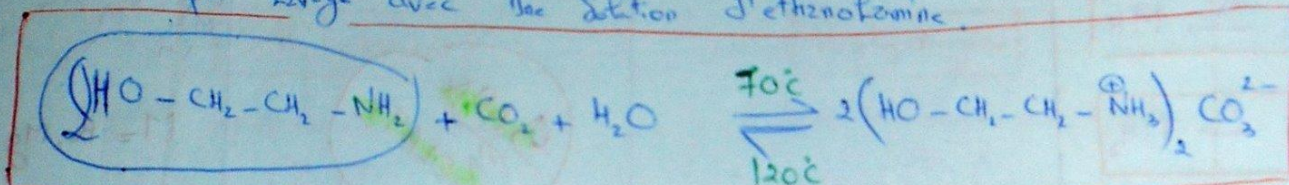
R.g.



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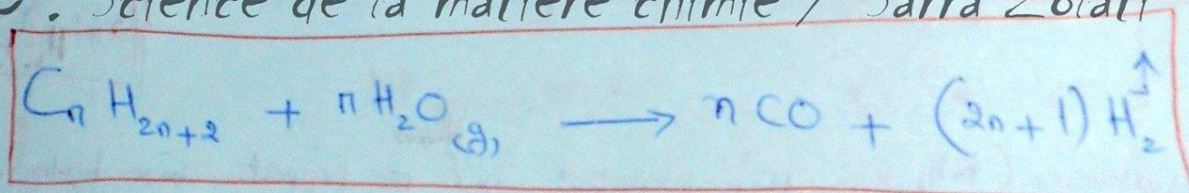
Séparation de CO_2 et H_2

par lavage avec une solution d'éthanolamine.



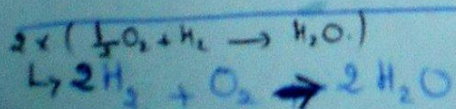
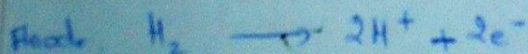
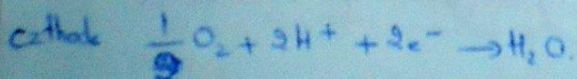
④ à partir des hydrocarbures

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Utilisation de l'hydrogène.

en Energie chimique



En énergie Nucléaire

②

LES HYDRURES

(Composés hydrogénés)

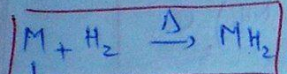
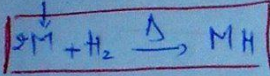
types d'hydrures

Ionique (selins)

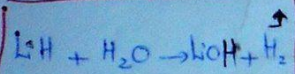
Liaison Ionique NaH , CaH_2

Préparation

chauffage du métal
de l'hydrogène.



Alcalino-terreux.



(interstitiels)

Métallique

Liaison Métallique

TiH (Non stœch.)

MnH
 TiH_2 (Stœch.)

Covalents moléculaires

Liaison covalente

NH_3

H_2O

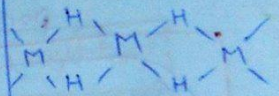
Covalents polymérisés

Liaison Covalente

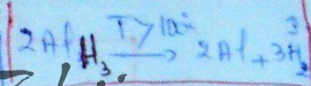
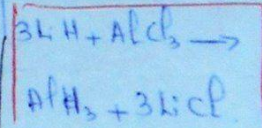
$(\text{AlH}_3)_n$

(BeH_2)

Ponts d'hydrogène



$\text{M} = \text{Be}, \text{Mg}$



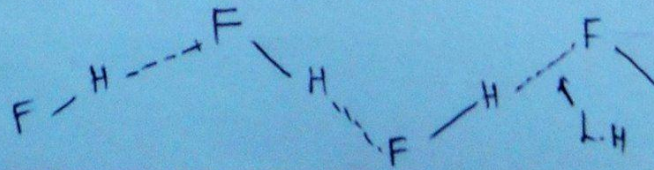
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Les hydrures ($\text{NH}_3, \text{H}_2\text{O}, \text{HF}$) présentent ^{clés} Te par rapport aux hydrures

de la M colonne. En effet la $\#$ de X est grande entre H et l'autre

atome. ^{liaison polaire} (Le pôle positif δ^+ porté par H se lie avec le δ^- porté par N, O, F)

Ce qui conduit à la formation des liaisons hydrogène qui nécessitent plus d'énergie pour les casser.



	II A	
2	Be	Beryllium.
3	Mg	Magnesium.
4	Ca	Calcium.
5	Sr	Strontium.
6	Ba	Baryum.
7	Ra	Radium.

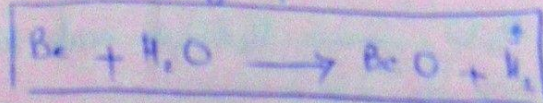
Alkaline-terreux

Electronegativity

GARY
ZLATI

Hand-drawn periodic table showing the classification of elements into metals and non-metals. The periodic table is drawn on a grid. A red line separates the 'Met' (Metals) region on the left from the 'Non-Met' (Non-metals) region on the right. The 'Met' region includes elements like Na, Mg, Ca, and Ba. The 'Non-Met' region includes elements like B, Al, Si, and P. A red arrow labeled 'Growth' points from left to right. A blue arrow labeled 'Acid de Lewis' points from the right side towards the right edge of the grid.

Be (Béryllium) Ne réagit pas avec de l'eau



car le est le plus électropositif des Alkalins et des Alkalino-terreux

BeO : forme une couche protectrice imperméable. Sur la Be_2Si et la réaction s'arrête à ce niveau.

Oxydes

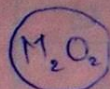
Li_2O oxyde de lithium
 Na_2O oxyde de sodium
 K_2O oxyde de Potassium
 Rb_2O oxyde de Rubidium
 Cs_2O oxyde de Cesium
 Fr_2O oxyde de Francium

$\text{Li} \rightarrow \text{Cs}$



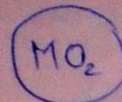
Peroxydes

Na_2O_2
 K_2O_2
 $\text{Na}_2\text{O}_2 \rightarrow 2\text{Na}^+, \text{O}_2^{2-}$
 $\text{D.O} = -1$

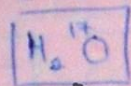
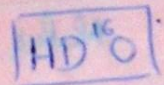
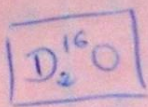


Superoxydes

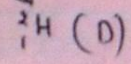
KO_2
 RbO_2
 $\text{KO}_2 \rightarrow \text{K}^+, \text{O}_2^-$
 $\text{D.O} = -\frac{1}{2}$



Isotopes de l'eau



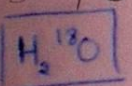
Isotopes de l'hydrogène



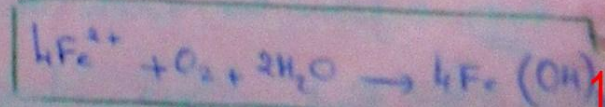
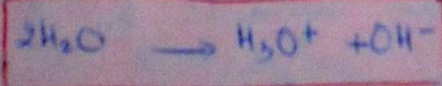
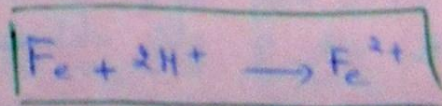
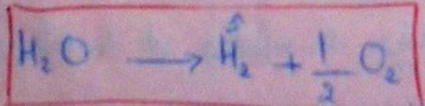
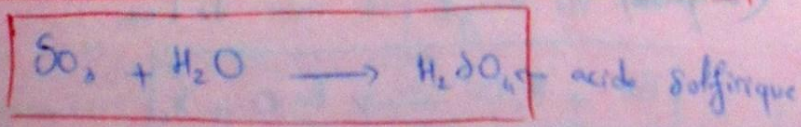
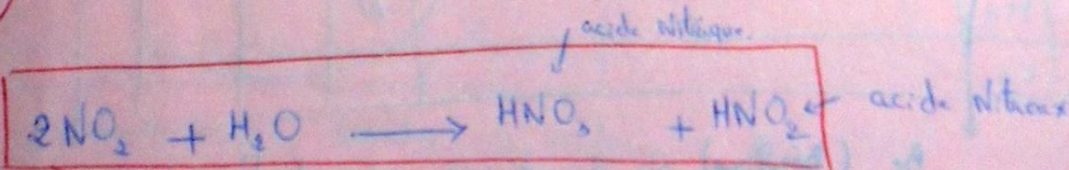
Isotopes de l'oxygène



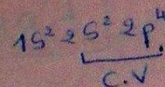
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OXYGÈNE



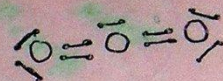
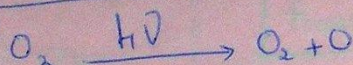
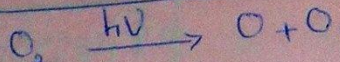
① OZONE

Formation de l'Ozone.

Rôle de O_2 : Absorbe les radiations U.V

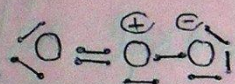
Dissociation de l'Ozone.

Réaction Photochimique.



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Formule de Lewis



②

Les fréons $CFCl_x$

CF_2Cl_2 , $CFCl_3$

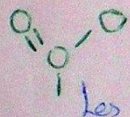
Ils sont utilisés dans les aérosols et comme gaz réfrigérants

Géométrie de l'atome



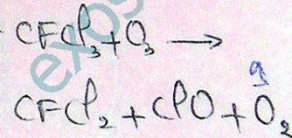
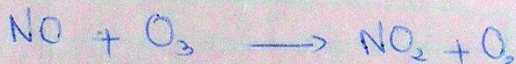
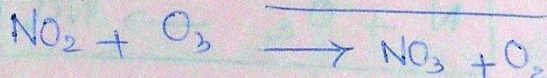
hybridation sp^2

géométrie trigonale (forme V)

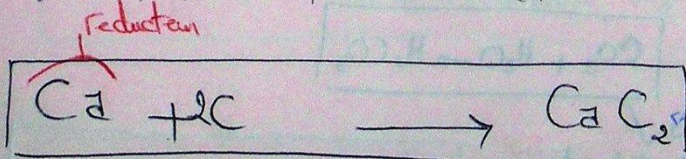


③

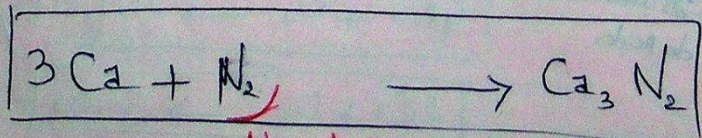
Les oxydes d'azote



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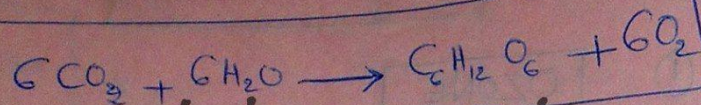


carbure de calcium.



Nitruure de calcium.

L'oxygène dissous dans l'eau



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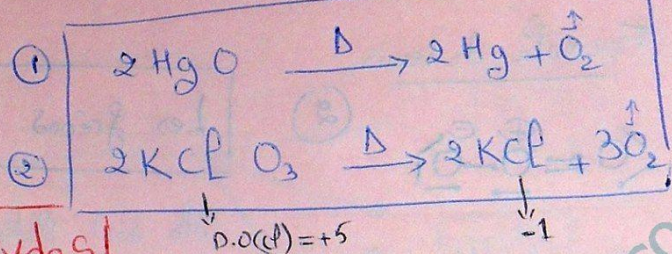
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Préparation

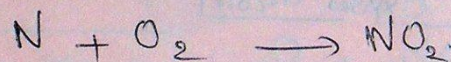
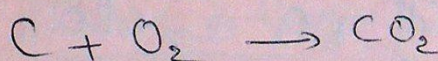
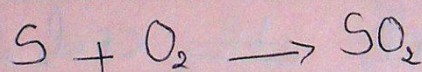
Industriellement

par distillation fractionnée
de l'air liquide

Au Laboratoire



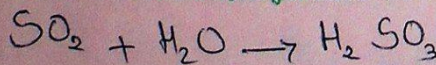
Les Oxydes



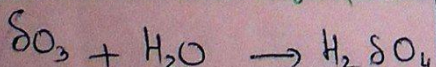
Les Oxydes + H₂O

→ Ils donnent des Acides
(oxyde acide)

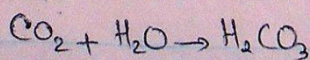
acide sulfurique



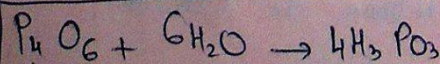
acide sulfurique



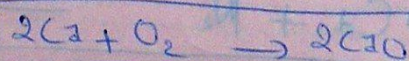
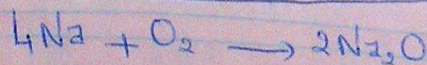
acide carbonique



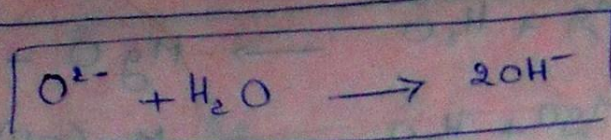
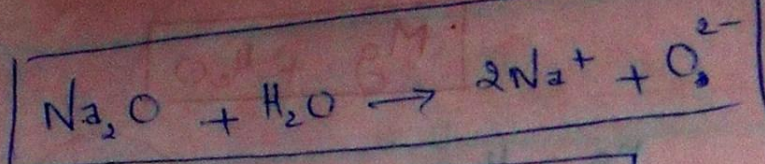
Ils donnent
des Acides.



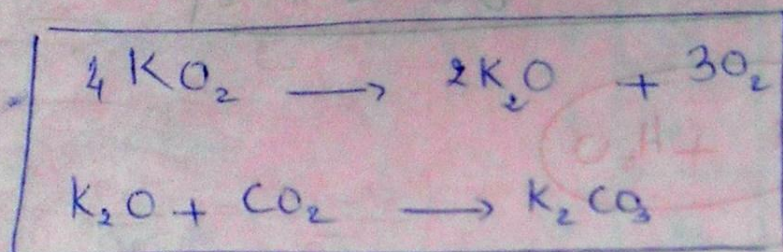
acide phosphoreux



Ils donnent
des Bases.



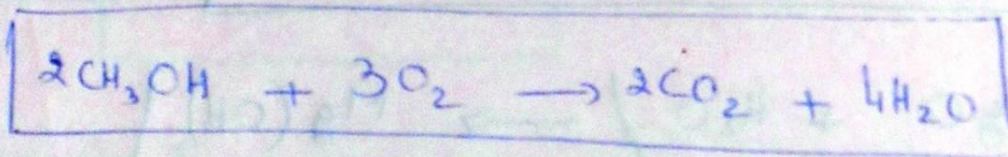
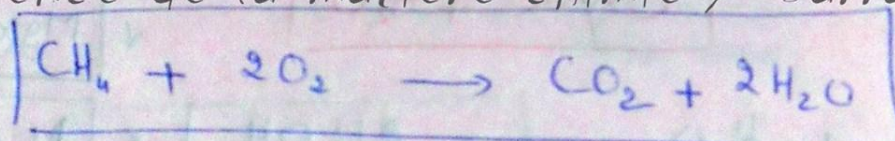
KO₂ : est utilisée comme revitaliseur d'air



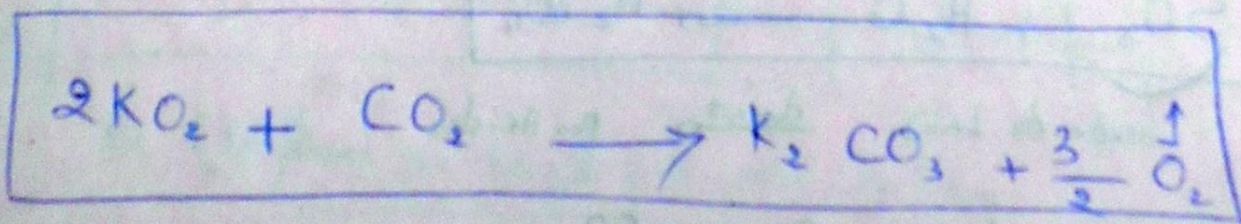
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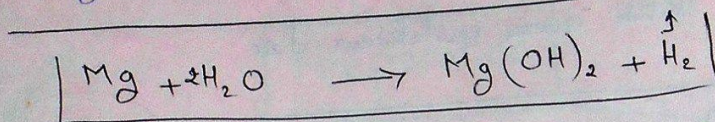
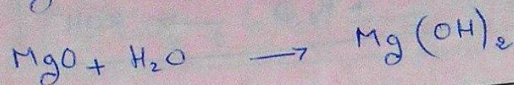
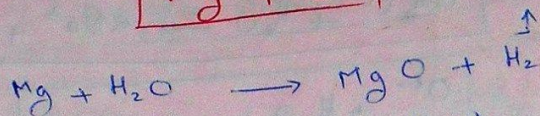
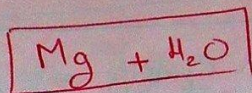
Réactions avec les composés organiques

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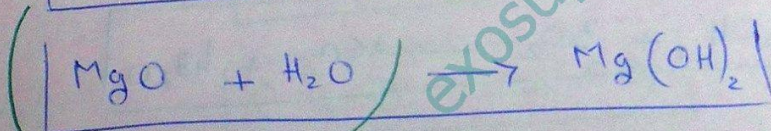
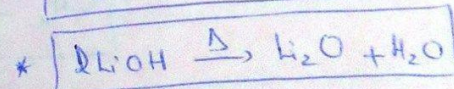
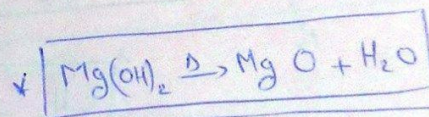
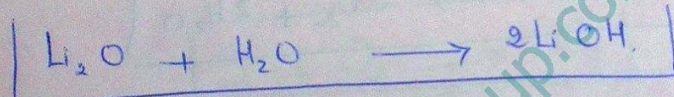
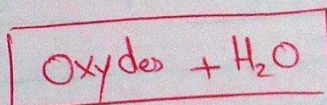
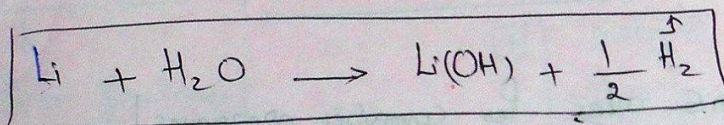
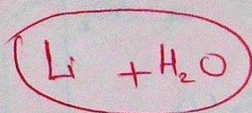


KO₂ est utilisée dans les mines et les engins spatiaux



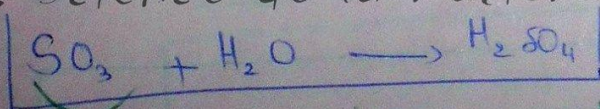


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ZOLATI

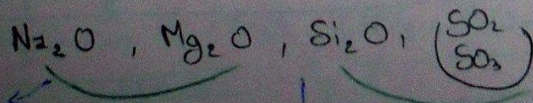


Bas de Lewis $\xrightarrow{\text{donent}}$ des Acides

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acide de Lewis $\xrightarrow{\text{donent}}$ des Acides



Le # d'x est grande
Zonc Composés ioniques
Ce sont des bases de Lewis

Le # d'x plus faible
Zonc composés covalents

Ce sont des Acides de Lewis + $\text{H}_2\text{O} \longrightarrow$

acide Fort $\text{H}_2\text{SO}_3 > \text{H}_2\text{SO}_4$

bases Fortes $\text{NaOH} > \text{Mg}(\text{OH})_2$

Les Halogènes

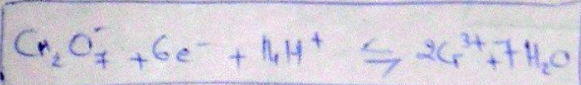
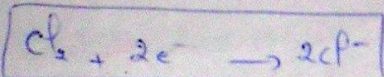
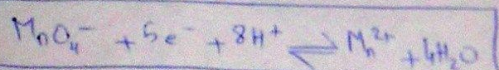
F, Cl, Br, I
VIIA

Préparation

Voie chimique

(Oxydation)

- MnO_2 en Milieu Acide $\xrightarrow{\text{donne}}$ Br, I
- $KMnO_4$ en Milieu Acide $\xrightarrow{\text{donne}}$ Cl, Br, I
- $K_2Cr_2O_7$ en Milieu Acide $\xrightarrow{\text{donne}}$ Br, I
- Sels ferriques (Fe^{3+}) en M.A $\xrightarrow{\text{donne}}$ I

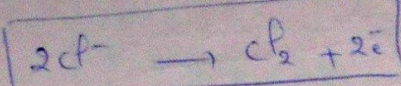
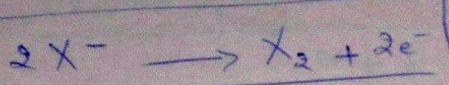


F_2 déplace Cl_2, Br_2, I_2
 Cl_2 déplace Br_2, I_2
 Br_2 déplace I_2

(Electrolyse)

Voie électrochimique

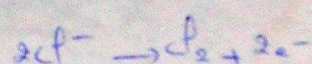
A l'anode



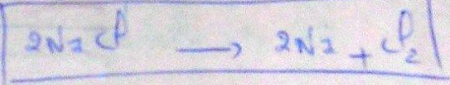
préparation Cl_2

Cathode

Anode



R.G



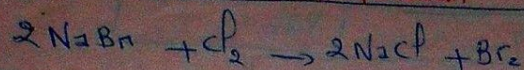
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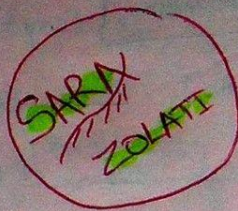
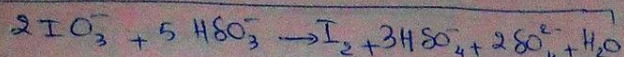
exosup.com

Préparation du Br

Réaction de déplacement



Préparation de I₂



Réaction de déplacement

Un halogène de Numéro atomique plus bas oxyde celui de Numéro atomique plus élevé.

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Le Carbone

2 Variétés allotropiques

Diamant

Graphite

Dioxyde de Carbone

